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VI. Publication of Species.

Publication of a species consists only (1) in the distribution of a printed description of the species named; (2) in the publishing of a binomial, with reference to a previously published species as a type.

VII. Similar Generic Names.

Similar generic names are not to be rejected on account of slight differences, except in the spelling of the same word; for example, *Apios* and *Apium* are to be retained, but of *Epidendrum* and *Epidendron*, *Asterocarpus* and *Astrocarpus*, the latter is to be rejected.

VIII. Citation of Authorities.

In the case of a species which has been transferred from one genus, to another the original author must always be cited in parenthesis, followed by the author of the new binomial.

ZOOLOGY.

Fortuitous Variation.—In a paper just published, read before the Biological Society of Washington, on "Some Interrelations of Plants and Insects," in which Professor C. V. Riley deals with the subjects of Yucca pollination and fig caprification, he generalizes from the facts recorded as follows:

"The peculiarities which I have endeavored to present to you are full of suggestion, particularly for those who are in the habit of looking beyond the mere facts of observation in endeavors to find some rational explanation of them; who, in other words, see in everything they observe significances and harmonies not generally understood. The facts indicate clearly, it seems to me, how the peculiar structures of the female Pronuba have been evolved by gradual adaptation to the particular functions which we now find her performing. With the growing adaptation to Pronuba's help, the Yucca flower has lost, to a great extent, the activity of its septal glands; yet coincident with it we find an increase in the secreting power of the stigma. This increase of the stigmatic fluid has undoubtedly had much to do with originally attracting the moth thereto, while the pollenizing instinct doubtless became more and more fixed in proportion as the insect lost the power or desire of feeding. With the mind's eye I can look back into the past and picture the gradual steps by which the Prodoxids to which I have alluded have differentiated along lines which have resulted in

their present characteristics. On the one side I see variations which have become sufficiently fixed to be considered specific; yet which can have no especial bearing on the life necessities of the species, but are a consequence rather of that universal tendency to variation with which every student of Nature becomes profoundly impressed. Thus the wing-markings vary from a darker general coloring, as in *Prodoxus œnescens,* to a more uniform intermixture of the black scales among the white, as in *cinereus,* or a sparser intermixture thereof, as in *pulverulentus.* The disposition of the black scales is in spots or bands, whether transverse or longitudinal, as in *marginatus, reticulatus, Y-inversus,* etc. These are fortuitous variations, for I can-cannot believe that the disposition of these marks where, as in these cases, they take every form that is conceivable, can be of any benefit to the species, any more than the mere variation in the number of lobes in the leaves of different oaks growing under like conditions can be of any particular benefit to the species, however useful to us in classification.

"In my address before the Section of Biology of the American Association for the Advancement of Science, at Cleveland, in 1888, I have discussed the various forms and causes of variation, and especially the limitations of natural selection, stating expressly that this last "deals only with variations useful to the organism in its struggle for existence, and can exert no power in fixing the endless number of what, from present knowledge, we are obliged to consider fortuitous characters," and I have long recognized, from my studies of insect life, the existence of these fortuitous variations. The subject has since been very well elaborated by Professor Ward in his communication to the Society (December 15, 1888) on "Fortuitous variation as illustrated by the genus Eupatorium" and in his Annual Address (January 24, 1891) on "Neo-Darwinism and Neo-Lamarckism," and the Prodoxidæ furnish an excellent illustration of this fortuitous variation. Yet at the same time that we note this chance variation, as exemplified in a number of the species of Prodoxus, which are mere ravagers or despoilers and have not been brought into any special or mutual relations with the plant, we have, on the other hand, in *Pronuba yuccasella,* correlated with the other striking structural modifications which have brought it into such special relations with the plant, an elimination of all maculation or markings upon the primaries, and a purely white coloring so fixed that it shows absolutely no variation over half the continent. The structural variation has been necessary—a consequence of effort, environment,

and natural selection. The color variation, on the contrary, has not been absolutely necessary, yet has nevertheless gone on in lines which, tending to give greater protective resemblance to the flower, have in the long run proved to be, perhaps, the most advantageous. I thus recognize three distinct lines of variation as exemplified in these Prodoxidæ, and what is true of them is, I believe, true of all alliances of organisms. The first and most important is structural and generic; it is absolutely essential and is preserved in its perfection by the elimination, through natural selection, of all forms departing from it. The second is merely coincident, not essential, but nevertheless along lines that are of secondary advantage. The third is purely fortuitous, affects superficial features in the main, is unessential (a consequence of the inherent tendency of all things to vary), and takes place along all lines and in all directions where there is no counteracting resistance."

Structure of Calcareous Sponges.—Minchin[1] finds in a calcareous sponge, which he identifies as *Leucosolenia coriacea*, a peculiar fenestrated membrane crossing the oscular openings. This " sieve membrane" is composed of two layers of cells and crosses the tube just above the limits of the flagellate entoderm. Minchin, with a question, identifies the two layers as ectoderm and entoderm, and thus is it probable that the membrane is formed by the gastral cavity breaking through to the exterior at several points during development. Interesting comparisons are made with the sieve plates of several Hexactinellids. In a second paper[2] the same author concludes from a study of Naples material that *L. clathrus* does not have the oscula permanently closed, but that these openings are capable of occlusion by means of a sphincter of ectoderm. Further that Haeckel's so-called species, *Ascetta labyrinthus*, *A. mœandrina*, *A. clathrina* and *A. mirabilis* are all different stages of contraction of the one species, *Leucosolenia clathrus.*

On Echinorhynchus.—Two extensive works on the embryology of *Echinorhynchus* have recently appeared in Germany, one by Kaiser, which is not yet completed, the other by Hamann.

The following is a brief summary of Hamann's article. (Die Nemathelminthen, Jena, 1891, 119 pages, 10 plates.)

The first stages can be studied to the best advantage on *E. acus.* The extrusion of the pole-bodies and the division into 2 and 4 cells

[1]Q. J. M. S., xxxiii, 251, 1891.

[2]*l. c.*, p. 490, 1892.

occur while the egg is still in the "egg-ball." It is not yet determined at what time the fertilization of the ovum takes place. In the case of *E. acus* the gastrula (larva with 6–8 hooks) goes through certain changes, in the body of the mother, which in other species are delayed until the parasite arrives in an intermediate host. According to Hamann the nuclei of the ectoblast unite to form very large nuclei, the ectoblast being a syncytium.

Ectoderm:—A syncytium with large nuclear bodies which are amoeboid and give rise by *direct division* to the nuclei of the skin; the fibres in the skin are looked upon as elastic. The species *E. clavæceps* is especially interesting: in this case the skin of the adult remains a syncytium with large nuclear bodies; author looks upon this as a case of paedogenesis. In other species the ectoderm separates into two layers: an outer layer with nuclei and elastic fibres, an inner layer in which the lacunes are formed. The lacunes of the skin and lemnisci form at the same time that the giant nuclei of the ectoderm divide into the skin-nuclei. The lemnisci arise as two lateral papillæ of ectodermal origin; these project into the body cavity; they are at first solid but when they have reached their full length a number of light colored spots became visible in their substance; these spots grow more numerous, become connected and form the canal-system. In *E. clavæceps* the lemnisci retain their larval character, being round with central canal and two very large nuclei. In other species the lemnisci are more highly developed; the canal-system is branched and numerous nuclei are present. The canal-system of the lemnisci, neck and rostellum unite in the circular canal and, according to Hamann (in agreement with Schneider but in opposition to Leuckart's view), are entirely separated from the lacunes of the rest of the body. The lemnisci are compared with the ampullæ of the echinoderms. Hamann supposes them to aid in stretching the rostellum and to act as a reservoir for the liquid when the rostellum is retracted.

Entoderm:—In the early stages the entoderm is a solid mass, but as the parasite develops, an outer layer of cells separates from the central mass and forms an epithelial lining membrane for the body-cavity (coelom); the remaining cells give rise to the genital organs and the ligament. On the outer layer peripheral circular muscle fibrillæ form in each cell, thus giving rise to epithelial-muscle cells of entodermal origin. Some of these cells leave their position in the epithelium and wander to its median surface where they assume a spindle shape and give rise to the longitudinal muscles, which anastomose.

The anlage of the proboscis forms very early; two cells differentiate at one pole of the entoderm, behind this the cells gradually coalesce. The sheath is also entodermal. The proboscis is formed *invaginated* inside the sheath; the cause of exvagination is to be sought for in the growth of the animal in length. (Reviewer does not understand author's argument in this case.) Before exvagination the rostellum is solid; what becomes of the centre core is somewhat uncertain. The hooks are also of entodermal origin; further, the nervous system, which arises at about the same time with the rostellum, and consists of a double ganglion at the base of the rostellum, two lateral and one median anterior nerves and two lateral posterior nerves. The latter connect with a double ganglion on the bursa of the male. The ganglion cells were uni-polar.

Hamann's results differ very greatly, in some particulars, from those arrived at by Kaiser. Kaiser's magnificent monograph will be reviewed in a later issue of THE NATURALIST.—C. W. S.

Onchnesoma.—Shipley has recently studied[3] the anatomy of *Onchnesoma steenstrupii*, the smallest species of this boreal genus of Sipunculids. In correspondence with its small size (length 3 mm.) it is much simplified. It has no tentacles, no vascular system, a single retractor muscle, a single nephridium, and a not-bilobed brain. On account of the lack of tentacles this Sipunculid, at least, does not breathe by these organs, and Shipley is inclined to regard the intestine as the chief respiratory organ here. He is farther inclined to think that the chief function of the tentacles, when present, is to create currents bringing food to the mouth, and that the chief use of the vascular system is to extend the tentacles.

The Hæmal Region of Echinoderms.—This portion of the echinoderm structure has always been a terra incognita. In the course of an interesting article on "Wandering Cells in Echinoderms"[4] (dealing with the processes of excretion throughout the animal kingdom) Mr. H. E. Durham says: "The following method of regarding the relations of the water tube, dorsal organ, axial perihæmal sinus, and the madeporic or water pores has, I believe, never been formulated; it has the advantage of bringing the different arrangements which have been described into harmony, and will put an end to the battles which have been fought over the point. First of all we must

[3]Quarterly Jour. Micros. Sci., xxxiii, p. 233, 1892.

[4]Quarterly Jour. Micros. Sci., xxxiii, 81, 1892.

refer to Bury's discovery that the central water vascular apparatus is developed in three pieces, (1) the water tube, (2) an ampulla of an anterior enterocœle, (3) the water pore. He further promises to prove that the left anterior enterocœle becomes the so-called slauchformiger canal, here called the axial perihæmal sinus. In specimens of Cribrella 2 mm. in diameter, I find that there is as yet but a single water pore, which communicates with the cavity of axial sinus; into the latter the free end of the water-tube opens; thus these three spaces are in communication with one another at a comparatively early period. Now this free communication may remain throughout life in many forms, as Cuénot proves, and as I showed in *Cribrella oculata.*

Now the cavity of the axial sinus extends amongst the strands which form the dorsal organ; these spaces we will term intercanicular as distinguished from the intracanicular which are the actual cavities of the strands themselves, and between them there is no free communication, as has already been stated.

In the dorsal organ of echinids there exist epithelium-lined cavities which communicate together, and with a cavity extending longitudinally along the organ; this is termed the canal aquifére annexe by Prouho, and the spaces Kanäle zum Wassergefäss gehörend by Hamann in *Spatangus purpureus.*

Into this space or system of spaces there is free communication on the one hand, with the water tube, and on the other with the madreporic pores, but this only occurs in certain forms (Spatangus, Dorocidaris). Hamann denies that there is any such communication in the regular echinids he investigated; this space, therefore, bears exactly the same position in these echinids that the axial (perihæmal) sinus holds in the asterid; in fact, the one is the homologue of the other. The presence or absence of free communication with the water and madreporic tubes depends on whether the embryonic developmental condition has been retained or lost. There is some difference in the arrangement of the axial sinus in the asterid and echinid, for whereas in the former the sinus contains the dorsal organ, in the latter it is nearly surrounded by the tissue of that organ; that is, in the former the wall of the sinus has only given origin to hæmal strand tissue along our line, whilst in the latter this tissue has been developed from all parts of the wall except a narrow strip on either side of the water tube. If we imagined the wall of the axial sinus of an asterid to contract upon the contained organ, and ultimately to come in contact and fuse with its surface, except along the stone canal, we should obtain a condition closely resembling that described by Prouho in

Dorocidaris; some alteration would have to be made in the structure of the dorsal organ at the same time, for it does not consist as definitely of a number of anastomosing tubular structures as it does in the asterid. Furthermore, we may predict that if, as Bury shows, that in asterids the axial sinus is derived from the left anterior enterocœle, careful investigation will show that the canal aquifére annexe, or axial sinus of echinids, is similar in its development.

In ophiurioids an axial (perihæmal) sinus exists, but according to Hamann it does not communicate with the water vascular apparatus in the adult.

This view seems to me to reconcile the discrepancies in the descriptions which have been published of the anatomy of the region, the differences having apparently arisen from the retention or loss of the embryonic condition of the individual examined.

Wild Animals and Snakes in India.—In the report on the Administration of the Bombay Presidency for the year 1890–91 is to be found the following interesting account of "The destruction of wild animals and venomous snakes": The whole number of people killed by wild animals and snakes within the Presidency, including Scind, during the year 1890, was 1122 as compared with 1160 in the previous year. The number of deaths caused by tigers and leopards was twenty only, of which sixteen occurred in the Khandesh District. In the previous year forty-seven persons were thus killed in that District. In the Broach District seven persons were killed by wolves and three by other animals. The mortality from snake-bite was slightly lower than in the previous year. The most deaths from this cause occurred in Scind, there being 497; the fewest in the Central Division, but 105. In the Northern and Southern Divisions there were 241 and 232 respectively. The number of wild cattle killed by beasts of prey and snakes decreased from 2188 in 1889 to 1883 in 1890. In Kanara, however, the number of cattle killed in 1890 was 938, exceeding the record for the past ten years. The total number of wild animals destroyed during the year was 836, and of snakes 406,092; this was 27,703 fewer snakes than in 1889. The total amount paid as rewards for the destruction of wild animals and snakes during the year was 12,655 rupees, 13 annas and 2 pice (about $5,695.15). (Forest and Stream, April 14, 1892.)

The Phylogeny of the Apteryx.—Prof. T. J. Parker concludes his memoir on the anatomy and development of the Apteryx[5] with the

[5]Phil. Trans., Vol. cclxxxii, 1892.

following summary of the characters supporting the view that Apteryx has been derived from a flying bird: The presence of an alar membrane or patagium; of pterylæ and apteria; of remiges and tetrices majores; the attitude assumed during sleep; the presence of two articular facets on the head of the quadrate; of a pygostyle; of vestigial acromial, procoracoid and acrocoracoid processes; the extreme variability of the sternum, shoulder girdle and wing, indicating degeneration; the occasional occurrence of a median longitudinal ridge or vestigial keel on the sternum; the position of the shoulder girdle and sternum in Stage E; the fact that the skeleton of the fore limb is that of a true wing in Stage F; the early assumption of undoubted avian characters in the pelvis; the typically avian characters, both as to structure and development, of the vertebral column and hind limb; the fact that the brain passes through a typical avian stage with lateral optic lobes; and the relations of the subclavius muscle.

On the other hand the total absence of rectrices tells against this view.

The following characters indicate descent from a more generalized type than existing birds. The characters of the chondrocranium, especially in the earlier stages, but many of these peculiarities, *e. g.*, the absence of interorbital septum, may, however, be correlated with the diminished eyes and the enlarged olfactory organs; the presence of an operculum in early stages (as this structure has not been described in reptiles, it either proves nothing or too much); the presence of a well marked procoracoid in comparatively late embryonic life; and the characters of the pelvis.

Again, the early assumption of their permanent position by the limbs; the late appearance and obviously degraded character of the hyoid portion of the tongue bone; the position of the nostrils and the peculiar mode of development of the respiratory portion of the nasal chamber and the total absence of clavicles are characters in which the Apteryx exhibits greater specialization than other birds.

The general balance of evidence seems to point to the derivation of both Ratitæ and Carinatæ from an early group of typical flying birds or Protocarinatæ.

It has always seemed to me that on the hypothesis of its development from an ordinary reptilian fore limb, *e. g.*, that of a Dinosaur, the wing is one of the most striking examples of the uselessness of incipient structures. If, on the other hand, we suppose it to have been evolved from a patagium which gradually diminished *pari passu* with

the development of its scales into feathers, the difficulty of its first origin is overcome and the presence of the alar membranes is explained.

Ridgway on the Anatomy of Humming-birds and Swifts.—Ornithological literature has very recently been enriched by a monograph upon the Humming-birds, from the pen of Mr. Robt. Ridgway of the U. S. National Museum. It comes to me in the form of a reprint from the Report of that institution for 1890, and is now just issued. As valuable as may be the descriptive part of the contribution, I find it impossible for me to overlook certain very glaring errors our author has fallen into, in regard to the anatomy of the birds he treats. Ridgway still adheres to that now well-nigh exploded notion that the Humming-birds are more or less closely related to the Swifts, and he says "The Humming-birds and Swifts further agree in numerous anatomical characters, and there can be no doubt that they are more closely related to each other than are either to any other group of birds." In setting forth some of the anatomical characters he claims to find in the Humming-birds, in support of this theory, he remarks in regards to the structure of the tongue that "it is hollow and divided at the tip into two slender branches * * * * *." Now the tongue in the Humming-birds is *not hollow*, and I would kindly invite Mr. Ridgway's attention to the very careful dissections of that organ made by the Scotch anatomist W. MacGillivray, and published in the 4th volume of Audubon's Birds of America, and also the results of my own extensive dissections which appeared in *Forest and Stream*, July 14, 1887 (p. 581).

Again our author states that "except in the shape of the bill and structure of the bones of the face, the Humming-birds and Swifts present no definite differences of osteological structure." (p. 290). This statement is not only not true, but as wide of the mark as it well can be, and the wonder to me is, how such a cautious and candid writer as Mr. Ridgway has always proved himself to be, could have allowed his pen to record such an error. As a matter of fact, when we come to compare the skeleton of a typical Swift with that of a typical Humming-bird we find the most radical differences existing in nearly every part, that one can well imagine. As Huxley and a number of other capable anatomists have long ago shown, the skull and associate skeletal parts of a Swift depart not very markedly from the corresponding structures in a Swallow, while they very decidedly differ from the same parts as we find them in a humming-bird. These differences are to be seen in nearly all the rest of the skeleton, when

we come to compare the characters presented on the part of the various bones in a typical Swift, a typical Swallow and a Humming-bird. Not only is this true but the same departures and agreements are to be found in other and quite as important systems of the economies of the several forms mentioned, as in the osseous system. It is several years ago now since I called attention to these facts, but they are very fully set forth in a number of papers of mine which have appeared from time to time in the P. Z. S.; in the Journal of the Linnean Society of London; in *Forest and Stream* and elsewhere.—DR. R. W. SHUFELDT, Takoma, D. C., July 26, 1892.

Zoological News.—Protozoa.—Schütt describes[6] for almost the first time the protoplasmic body of the Peridiniidæ. The richness of the vacuolution is interesting but is not easily described without illustration.

Greef continues[7] his description of the earth Amoebæ. After an account of the general morphology of the group follows a description of the species, of which two are new.

Vertebrata.—A. H. Church has re-studied the peculiar pigment turacin found in the birds of the family Musophagidæ. He finds[8] that eighteen out of the twenty-five species of the family constantly possess this copper containing pigment and that these eighteen species embrace all the members of the genera Turacus, Gallirex and Musophaga, while the other genera of plantain eaters lack it. The analysis of turacin proved very difficult. The best results seem to show the existence of 7% of copper.

Waldeyer describes[9] with some detail the histology of the stomach and intestine of *Manatus americanus*.

F. E. Schulze says[10] that with Golgi's chrom-osmic-silver method one can readily trace free nerve ends in the epidermis of the lip of the fish Cobitis fossilis. In sections one can occasionally trace the deep black nerve fibres clear to the epidermal surface, where they end either abruptly truncate or with a small end knot (knötchen).

[6]Stz. k. Akad. Berlin, 1892, p. 377.

[7]Stz. Gesell. Naturwiss, Marburg, 1891, p. 1 (1892).

[8]Proc. Roy. Soc., li, 399, 1892.

[9]Stz. k. Preus. Akad. Wiss., Berlin, 1892, p. 79.

[10]Stz. k. Preus. Akad., Berlin, 1892, p. 87.